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LXXV. *An Account of a manuscript treatise, presented to the Royal Society, intituled, Traité du corail, contenant les nouvelles decouvertes, qu'on a fait sur le corail, les pores, madrepores, scharras, litophitons, eponges, et autres corpset productions, que la mer fournit, pour servir a l'histoire naturelle de la mer; that is to say, A Treatise upon Coral, and several other Productions furnish'd by the Sea, in order to illustrate the natural History thereof, by the Sieur de Peyffonnel, M. D. Correspondent of the Royal Acad. of Sciences of Paris, of that of Montpellier, and of that of Belles Lettres at Marseilles; Physician-Botanist, appointed by His Most Christian Majesty in the Island of Guadalupe, and heretofore sent by the King to the Coasts of Barbary for Discoveries in Natural History. Extracted and translated from the French by Mr. William Watson, F. R. S.*

Read May 7, 1752. **T**HIS curious treatise before us, containing upwards of 400 quarto pages in manuscript, was transmitted to the Royal Society from Guadalupe. It is the result of the observations of above thirty years; and was sent hither, as M. de Peyffonnel informs the Society by a letter dated

dated at Guadalupe May 1, 1751, to be inserted, if it should be found worthy, in the *Philosophical Transactions*.

He does this, as he perceives, that in France some lovers of natural history do attribute and even appropriate to themselves his labours and his discoveries, of which they have had the communication; and that himself, retired to the West Indies, and not having the means of giving to his work the perfection he desired, for want of books, and yet more for want of judicious persons, with whom he might not only consult, but who might also enable him to give a more full explanation to such passages of his work, as might be thought obscure, and even correct the faults thereof; for which reason he takes the liberty to request this good office of the Royal Society.

This treatise is divided into two parts; the first of which relates to coral only, and is subdivided into ten chapters; to which is subjoined a catalogue of the remedies and compositions, as well chemical as galenical, in which coral is an ingredient. The second part is subdivided into eight dissertations, each of which has for its object some production of the sea; and the whole tends to evince, that as well coral, as the other marine bodies herein specified, and hereafter to be consider'd, are produced by animals, *viz.* different kinds of *urtica marina* & *purpura*. To these the author has added a complete index, referring to every thing taken notice of in the whole work.

This work is the result of a great number of very curious observations and inquiries, and has for its object a part of natural history not hitherto well known.

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For the difficulties, which there are, in getting from the bottom of the sea its productions, and the few opportunities, which occur, of making the necessary observations upon sea-plants, have been the cause, that this part of botany has been hitherto very imperfect; and that the antients have been ignorant of the organisation and structure of these plants, of which they were acquainted but with a very small quantity, although the different species are exceedingly numerous.

M. Peyssonnel, disposed from his youth to the study of natural history, after having qualified himself for the practice of medicine, applied himself with great diligence to that science, to which his inclinations so strongly prompted him; and being a native of, and residing at Marseilles, he had the opportunity of examining the curiosities of the sea, which the fishermen, more especially those who search for coral, furnished him with. These considerations engaged him to endeavour to illustrate this obscure part of natural history, which he was more particularly enabled to do, as he could examine the productions of the sea the moment they were taken out of the water, or even in the sea itself, when these bodies are in their natural state: for most of those naturalists, who have treated of them already, have not examined them, but when they have been disfigured by the air, and have changed their true state by being dried. Besides, that tranquillity of mind, which a just observer should be always in possession of, is frequently disturbed in those little slight boats used by the coral-fishers. These, as well as several other difficulties, have been the cause, why we have so little knowledge

of the natural history of the sea. Our author found the means of overcoming these obstacles : the voyages which he made to the American islands, to St. Domingo, to Mississippi, to Egypt, and elsewhere, have accustomed him to the fatigues of the sea ; and the frequent opportunities of embarking himself with the coral-fishers and others were very favourable to his purpose, and contributed to the discoveries, which he made upon this subject, and which he verified and enlarged, when in Barbary by the king's orders. As coral, next to pearls and ambergrise, was the most precious marine production, it was not to be wonder'd at, that our author first turned his thoughts to the investigation of its history.

The first chapter therefore of the work before us contains the opinions of the antients concerning coral, and the observations made thereupon since their time ; among which are the opinions of Peireskious, Boyle, Piso, Boccone, Venette, the Comte de Marfigli, and those of M. de Peyssonnel.

In the second chapter is an examination, whether coral is a plant, or a congelation ; in which are included two extracts, one from M. Tournefort's elements of botany, and the other from the memoirs of the Royal Academy of Sciences.

The third chapter exhibits new observations, from which are discovered the *urtica marinæ* & *Purpuræ*, which form coral ; wherein likewise are explained the formation and mechanism of this marine production.

In the fourth chapter we find new chemical observations upon the distillation of coral, which tend to prove, that coral is the production of insects.

In

In the fifth chapter are exhibited the definition, etymology, colours, and different sizes of corals, and of the insects inhabiting therein.

The sixth chapter shews us the places, where they fish for coral, and the manner of fishing for it.

In the seventh chapter we have the manner of working upon, and of polishing coral, and the commerce therewith.

The eighth, ninth, and tenth chapters give us the chemical preparations of coral, its virtues and uses in medicine, when variously prepared.

The subjects of the eight dissertations of the second part of this work are the several species of vermicular tubes found in the sea, the madrepores, millepores, lithophytons, corallines, sponges, the various shell-fish, which inhabit the sea without changing their place, and the formation and mechanism of these several substances.

This then is the general scope of our author ; and though every part of his work deserves to be considered, I must, upon account of the time usually allowed to works of this nature, confine myself to such parts only, as seem most to merit the attention of the Royal Society.

It had been long the received opinion, that coral was soft in the sea, and was harden'd by the air upon taking it out of the water ; and our learned Mr. Boyle was not willing to quit this opinion. But as experiments are the only way of assuring ourselves of the truth, Boccone, for this purpose, went to sea in one of the coral-fishers vessels, and by plunging his arm into the water had an opportunity of examining the coral, as they were fishing it up, before it came

into the air. He invariably found it hard, except a its extremities ; where, upon pressing it between the nails of the fingers, it furnished a small quantity of a milky fluid, resembling in some degree the juice of spurge or sow-thistle. Boccone observes farther, that he saw several furrows under the bark of the coral, which terminate at the extremities of the branches, about which one might clearly see several small holes of the form of a star, which he imagines are destined for the production of branches. Vennette's account of coral in his treatise of stones is much the same as Boccone's.

The Count de Marfigli, in a letter to the Abbé Bignon, in the year 1706, takes notice, that, in order to give the most exact account of the production of coral, he wanted to be assured, whether the milky juice before-mentioned was found therein both in winter and summer, which was a matter of dispute even among the coral-fishers. For this purpose he went in winter for a few days to sea with the coral-fishers, and made several important discoveries into the nature of coral. He sent the Abbé Bignon an account of some branches of coral, which he found cover'd with flowers, and which was a thing unknown even to the coral-fishers themselves. These flowers were about a line and a half in length, supported by a white calyx, from which proceeded eight rays of the same colour. These were of the same length, and of the same distance one from the other, and formed a star-like appearance. These bodies, which the Count de Marfigli imagined were flowers, M. Peyssonnel afterwards discover'd to be the insects inhabiting the coral. As to the fact, whether the coral furnished a milky juice
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in winter as well as in summer, Count de Marfigli observed, that he did in December find the milky juice between the bark of coral and its substance, in the same manner as he did in the month of June preceding.

M. de Peyssonnel was unwilling, that the idea, which the ingenious discovery of the Count de Marfigli had given, in relation to the flowers of coral, should be lost; and therefore, being at Marseilles in the year 1723, he went to sea with the coral-fishers. Being well apprised of what Marfigli had observed, and the manner of his making these observations, as soon as the net, with which they bring up the coral, was near the level of the water, he plunged a glass vessel therein, into which he convey'd some branches of coral. Some hours after, he observed, that there appear'd a number of white points upon every side of this bark. These points answer'd to the holes, which pierced the bark, and formed a circumscribed figure with yellow and white rays, the center of which appear'd hollow, but afterwards expanded itself, and exhibited several rays resembling the flower of the olive-tree; and these are the flowers of coral described by Marfigli.

Having taken this coral out of the water, the flowers enter'd into the bark, and disappear'd; but being again put into the water, some hours after they were perceptible again. He thought them not so large as the Count de Marfigli mentions, scarce exceeding in diameter a large pin's head. They were soft, and their petals disappear'd, when they were touched in the water, forming irregular figures. Having put some of these flowers upon white paper,

they lost their transparency, and became red as they dried.

Our author observed, that these flowers grew from the branches in every direction, from broken ones, as well as from those which were whole ; but their number lessen'd towards the root ; and after many observations he determines, that what Marfigli took for flowers were truly insects.

Coral is equally red in the sea as out of it ; and this redness is more shining, when just taken out of the water, than even when it is polish'd. The bark of coral, by being dried, becomes somewhat pale. The extremities of its branches are soft, to the length of five or six lines ; they are fill'd with a whitish juice tending to yellow. The coral-fishers said, that in the month of May this juice did sometimes appear upon the surface of the bark ; but this, notwithstanding great attention, our author could not observe.

The body of coral, although hard, seems to give way a little, when press'd between the fingers ; and being broken at different distances, when just taken from the water, there always came therefrom a small quantity of milky juice through certain tubes, which appeared to be destin'd towards the bark.

Having inquired of the fishers in what direction the coral grew in the sea, they acquainted him, where the depth of the sea permitted them to dive, that they had found it growing sometimes perpendicularly downwards, sometimes horizontally, and sometimes upwards.

Having verified these observations during the eight days he staid with the fishermen, he adds, that he had never found any pores perceptible in the substance
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of the coral; that there issued forth less milk from the large branches than from the smaller ones; and that the first were harder, and less compressible.

The bark of coral covers the whole plant from the root to the extremities of the smallest branches. It will peel off; but this is only when just taken out of the water. After it has been exposed for a short time to the air, you cannot detach it from the body of the coral, without rubbing it to powder. This bark appears pierced with little holes, and these answer to small cavities upon the substance of the coral. When you take off a piece of this bark, you observe an infinite quantity of little tubes, which connect the bark to the plant, and a great number of little glands adhering to these tubes; but both one and the other do not distinctly appear, except when they are full of juice. It is from these tubes and glands that the milky juice of coral issues forth. Besides these, you see in variety of places the bark push itself outwards, where the substance of the coral is hollow'd, and form'd into the little cells, taken notice of by Boccone and Marfigli. In these you see little yellowish bodies, of the length of half a line, which terminate at the holes in the bark; and it is from these that the flowers appear.

Our author has found branches of coral, which, having been broken, have fallen upon other branches, have fasten'd themselves thereto, and have thus continued to grow. He has found, when a piece of stone, shells, or other hard bodies, have offer'd themselves between the ramifications of coral, that it has expanded itself over them, and enveloped them in its substance. He has seen pieces of coral growing upon

upon detached pieces of rock, glass bottles, broken pots, and other substances, from which the plant could receive no nourishment. It has been said by great authority, that coral grows from the rocks perpendicularly downwards; but our author has seen some growing to a round flint, which must necessarily have vegetated upwards, like most other plants.

M. de Peyssonnel proceeds to examine, whether or no coral is a plant, according to the general opinion, or a petrification or congelation, according to some; and after have exhibiting the various arguments deliver'd in support of these, he concludes, that coral, as well as all other stony sea-plants, and even sponges, are the work of different insects, particular to each species of these marine bodies, which labour uniformly according to their nature, and as the Supreme Being has order'd and determin'd. The coral-insect, which is here called a little *urtica*, *purpura*, or polype, and which M. Marfigli took for its flower, expands itself in water, and contracts itself in air, or when you touch it in water with your hand, or pour acid liquors to it. This is usual to fishes or insects of the vermicular kind.

When our author was upon the coasts of Barbary in 1725, he had the pleasure of seeing the coral-insect move its claws or legs; and having placed a vessel of sea-water with coral therein near the fire, these little insects expanded themselves. He increased the fire, and made the water boil, and by these means kept them in their expanded state out of the coral, as happens in boiling shell-animals, whether of land or sea. Repeating his observations upon other branches, he clearly saw, that the little holes, perceptible upon the bark of the coral, were the openings
through

through which these insects went forth. These holes correspond with those little cavities or cells, which are partly in the bark, and partly upon the substance of the coral; and these cavities are the niches, which the insects inhabit. In the tubes, which he had perceived, are contained the organs of the animal; the glandules are the extremities of his feet, and the whole contains the liquor or milk of coral, which is the blood and juices of the animal. When he press'd this little elevation with his nails, the intestines and whole body of the insect came out mix'd together, and resembled the thick juice furnish'd by the sebaceous glands of the skin. He saw, that the animal, when it wanted to come forth from its niche, forced the sphincter at its entrance, and gave it an appearance like a star with white, yellow, or red rays. When the insect comes out of its hole without expanding itself, the feet and body of it form the white appearance, observed by Marfigli; but being come forth, and expanded, it forms what that gentleman and our author took for the petals of the flowers of coral, the calyx of this supposed flower being the body of the animal protruded from its cell. The milk before-mention'd is the blood and natural juice of the insect, and is more or less abundant in proportion to its health and vigour. When these insects are dead, they corrupt, and communicate to the water the smell of putrid fish.

The substance of coral, by a chemical analysis, scarce furnishes either oil, salt, or phlegm: live coral with its bark furnishes about a fortieth part of its weight in these; but the bark of coral alone, in which are contain'd these animals, affords a sixth part.

part. These principles resemble those drawn from human scull, hartshorn, and other parts of animals.

After the accounts here laid down, we are able to assign the reasons of all the particular facts we observe in coral. We see, why a branch thereof, broken off and detach'd from its stem, may flourish. It is because the coral-insects, which are contain'd in its cells, not having been injured, continue their operations; and drawing no nourishment from the stem of the coral, are able to increase, detached and separate. How they live and are nourished, is proposed to be explain'd in treating of the urtica of the Madrepora, in which these animals are vastly larger, and appear very distinctly.

In each hole or star of the Madrepora, on which our author lays the evident proof of his new system, the urtica, placed in the centre of each pore, causes it to increase in every direction, by lifting itself further and further from the centre of the stone. And in coral, and in the lithophyton, the urtica, being niched in their crusts or barks, deposits a juice or liquor, which runs along the furrows perceiv'd upon the proper substance or body of coral, and, stopping by little and little, becomes fixed and hard, and is changed into stone; and this liquor, being stopped by the bark, causes the coral to increase proportionably, and in every direction. In forming coral, and other marine productions of this class, the animals labour like those of the testaceous kind, each according to his species, and their productions vary according to their several forms, magnitudes, and colours.

If, after what has been here laid down, some will still consider these marine productions as plants, they
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are truly zoophytes, formed by the labour of the animals, which inhabit them, and to which they are the stay and support.

By what is exhibited in this work, the author conceives, that he has explain'd the nature of these several marine productions, which have hitherto been so enigmatical. It is true indeed, that no reasons can be assign'd, why the oeconomy of these animals is directed in such or such particular forms. We can no more account for the admirable structure and colour of several species of shell-fish: we must in this, as in most of the other operations of nature, cry out, *O altitudo divitiarum!*

Swammerdam seems to have proceeded very far in these discoveries, as you may see by his letter to Bocconi*. He goes farther, and says, that having with a microscope examin'd a piece of coral, he found, that each particle thereof was composed of ten or twelve angular and chrystalline spherules; and having saw'd across a piece of coral, and given it the highest polish, he found with the microscope, and even without it, that coral from its centre is disposed in *strata*, which he conjectures are form'd by the application of the above-mention'd spherules.

M. de Reaumur, having been made acquainted with what M. de Peyssonnel had observ'd, sent him a letter thereupon in the year 1726; wherein he takes notice, that no one had hitherto consider'd coral as the work of insects. But it seem'd to him difficult to establish this doctrine in the generality of

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* Lettre xix. fol. 164.

marine productions, as was our author's opinion. That however you consider'd coral and lithophytons, it did not appear possible, that they were the constructions of the insects inhabiting therein : That the only system to be adopted upon these matters, was, what he mention'd to our author heretofore ; and that is, that the bark of these bodies only is a plant properly speaking ; and that this deposits a stony matter, which forms the stalk necessary to sustain it. That then, in his opinion, all the difficulties vanish with regard to the organization of coral.

In the year 1726, M. de Peyssonnel was appointed physician-botanist to the island of Guadeloupe, where he has continued his observations, which have more and more convinc'd him of the truth of his system. He takes notice, that the leprosy, a disorder elsewhere almost unknown, is frequent in this island : Our author must mean here the *elephantiasis*, or leprosy of the Greeks ; as that of the Arabians is too frequent every-where.

M. de Peyssonnel acquaints us, he has since found, that M. Bernard de Jussieu and M. de Reaumur were themselves convinc'd of the truth of his observations in the expeditions they have made, one to the sea-coasts near Rochelle, and the other in Normandy.

In the course of this work our author mentions, that, besides the animals to which coral owes its formation, there are three kinds, which he describes at large, which pierce and corrode the coral while in the sea, without preventing its increase.

Contrary to what has been generally received, and to what even the Count de Marigli asserts, coral
grows

grows among the rocks, and in the caverns of the sea, open to every exposure. It had always been said, that it never grew in caverns open to the north; they must always be exposed to the south, at least to the east or west: but upon the coast of Barbary, which lies open to the north, coral is not less frequently found than elsewhere. It is generally observed to grow better and more readily in shallow than in deep water; and though they generally fish for it at the depth of ten or twelve fathom, they sometimes get it, though but seldom, at an hundred and twenty.

M. de Peyssonnel then gives us the manner of coral-fishing, and describes two different machines made use of for this purpose: one, for fishing up the coral where the bottom is smooth, and it is the same, which is described by Gassendi in his life of Peyreskious. The other, which is called in the Provençal language the *salabre*, is constructed so, as to be employ'd where the bottom of the sea is rocky and unequal. He takes notice of the great skill and address of the coral-fishers in the management of these machines, as well as their sagacity, in finding, at considerable distances from the shore, the very places, where some time before they have been successful. I am sorry he has omitted to send us the figures and representations of this fishing, which he tells us he has in his museum.

In the course of this work, our author takes notice, that all the productions of the sea, of which he is now treating, have been consider'd by naturalists sometimes as stones, and sometimes as plants. Their stony substance deceived some, their tree-like appearance

others; infomuch that the bulk of writers, who have not feen thefe bodies except in their cabinets, have only confider'd their figures. They have denominated pora that clafs of them, which feem'd pierc'd with holes. Of thefe they found fome, the holes of which were large; and thefe they call'd madrepora.

There is another confufion among the writers concerning thefe bodies: all thofe, which had a tree-like form, whether their fufaces were fmooth, without holes, or whether they were rough and unequal with them, they were all together filed corals. Thofe of any other form than that juft now mentioned, were call'd madrepora, lithophyton, or alcyonium. It therefore appears neceffary to eftablifh fome effential characters to be able to diftinguifh thefe different bodies one from another; but before thefe marks of diftinction are laid down, our author thinks proper to examine, what thefe bodies are, and how they are formed. He proceeds to remark, that divers productions are found in the fea of a ftony nature. Thefe bodies are always equal, and always the fame in their different fpecies: they have the fame arrangement of parts, the fame effential figure, and differ in nothing but in their outward form, like different vegetables. They are all pierced with holes and pores, which are of the fame fize and figure, and are of the fame difpofition in each fpecies; fo that it appears evident, that they are all produced from the fame matter. How they are produced, and their mechanifm, has been hitherto unknown.

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Our author has given us, when treating of coral, several observations of other persons relating thereto ; but he finds none relating to the madrepora, and the other sea productions. But the knowledge, which he had acquired into the nature of coral, conducted him to the discovery, which he made, of the animals, that form the madrepora.

As this system is new, he thinks it necessary to give his observations, as they enabled him to form it. He defines the madrepora's to be all those marine bodies, which are of a stony substance, without either bark or crust, and which have but one apparent opening at each extremity, furnish'd with rays, which proceed from the centre to the circumference. He then takes notice of the means, by which he found the madrepora to be the habitation of animals. So early as the year 1719, when his curiosity carried him to the coral-fishing on the coast of Provence ; and though intent only upon coral, and neglecting to examine any other marine production, he nevertheless observ'd, that the extremities of the madrepora were soft, and cover'd with a mucosity, which had a fishy-smell. From thence he suspected, that therein was contain'd some kind of animal, but his curiosity stopp'd here. Afterwards, being upon the coasts of Barbary, the fishermen brought him in a barrel of sea-water one of those madrepora's, which are call'd in Provence, *fenouille de mer*, or sea-fennel. It had been put into the barrel as soon as it was taken out of the sea ; and he observ'd, that the extremities of this madrepora were soft and tender, furnish'd with a transparent mucosity, like that of snails :

snails; these extremities were of a beautiful yellow colour, and were five or six lines in diameter.

He therein saw an animal, resembling the cuttle-fish, polype, or sea-nettle. The body of this fish fill'd the centre; its head was placed in the middle thereof, and was surrounded by several feet or claws: these feet fill'd the intervals of the partitions observ'd in the madrepora, and were at pleasure brought to its head, and were furnish'd with yellow *papillæ*. Its head or centre was lifted up occasionally above the surface, and often contracted and dilated itself like the pupil of the eye. He had the pleasure of seeing it move distinctly all its claws, as well as its head or centre.

We can easily conceive all these motions, from what we all of us have lately seen in the fresh-water polype, discover'd by our worthy member Mr. Trembley: and it is to be observ'd, that the great sea polype (which is eaten in Lent in the Mediterranean, and which is found upon our own coasts, and usually call'd a *prule*) the animal of the madrepora, that of coral, and the fresh-water polype, scarce differ but in magnitude; so that from having seen one, an idea of the rest may easily be formed. And I mention this with the more freedom, as I myself, upon a visit with Mr. Trembley in Suffex at the late excellent Duke of Richmond's, whose loss we yet lament, saw the same order and oeconomy observed in the coralline*, as is mention'd by M. de Peyssonnel of
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* In that species of it intituled by Mr. Ray, *Corallina minus ramosa alterna vice denticulata*. Vide Raii Synops. Edit. 3. p. 35.

the coral and madrepora. This phænomenon Mr. Trembley had discover'd some time before ; and having put some fresh collected coralline into a phial of sea-water, brought it to Goodwood ; where, after it had been suffer'd to remain at rest a few hours, by the assistance of a microscope a great number of very small white polypes, exactly in form resembling the fresh water polype, but infinitely less, were seen to protrude themselves from the inequalities of the coralline, each of which serv'd as an habitation for a polype. When the water was still, these animals came forth, and mov'd their claws in search of their prey in various directions ; but, upon the least motion of the glass, they instantly disappear'd ; as was the case of the coral-insect, describ'd by our author.

But to return. The flesh of the animal of the madrepora is so soft, that it divides upon the gentlest touch. This soft texture prevented M. de Peyssonnel from detaching any one ; and he observes, that there are in those seas several large species of urtica, which become pappy upon the least touch. He mentions one sort of above a foot in diameter, whose body is as large as a man's head, and which are of a poisonous nature.

After the madrepora had been preserved three days, the animals therein cover'd its whole surface with a transparent jelly, which melted away, and fell to the bottom of the water as the animal died ; and both the water and madrepora then had a putrid fishy smell. After having destroy'd and consum'd all the animals, the extremities of the madrepora became white.

Imperatus

Imperatus seems to have border'd upon this discovery, when he says, " that the extremities of the
 " madrepora are soft, of an obscure purplish colour;
 " containing a membranous substance ; from whence
 " one might suspect, that it partakes of a sensitive
 " and animal life."

Our author made the experiment here laid down upon every species of madrepora, which he found, during the three months he continu'd upon the coasts of Barbary. He observ'd always the same appearance, allowing some little difference for the colour and size of the animals, the texture of their bodies, and that of the bodies themselves, upon which they were produced.

From what I have here extracted concerning the coral and madrepora, an idea may be formed of the millepora, lithophyton, corallines, and sponges ; each of which is, according to our author, the habitation of numerous animals, and form'd by them. He has given us from his own observations particular accounts of each of these productions, and divided them into *genera* and *species* with great accuracy ; and though in common they are the habitations of animals, each species varying in form and bulk, and composing its cell in various forms and manners, and of different consistences, constitutes their essential character. As oysters, scallops, muscles, cockles, snails, &c. have a power given them by the Author of nature of forming and enlarging their separate dwellings ; to these bodies, the subjects of this treatise, the same power is given, but in large families.

In the madrepora, its animal occupies the extremity ; in the millepora, the substance ; in corallines
 and

and sponges, the void places; in coral and lithophytions, the cortical parts.

Each of these animals, according to their kind, furnish substances, differing, as much in consistence as in form. That of coral is extremely hard, and compact; the madrepora and millepora are of a stony, but more loose texture; the coralline is still more soft; the lithophyton of a substance nearer horn than stone; and the sponge is soft and elastic.

We observe a great variety in the operations of nature: the crab, the cuttle-fish, and the sea spider, are endow'd with a testaceous covering; the esculent sea polype, and others of that class, have no such defence. So most of the animals, hitherto taken notice of in this treatise, have a secure retreat; but there is a production, denominated by Imperatus *Lorica marina*, which has no such convenience. It is, if I may be allow'd the expression, a soft madrepora. It grows at the bottom of the sea, and is a series of circular tubes, of about half an inch long, and of two or three lines in diameter. Each of these, at the end most remote from the centre, is furnish'd with a sphincter, from which are occasionally protruded the legs or claws of the animal, like those before-mention'd. The tubes themselves are likewise at pleasure lengthen'd and shorten'd. They are fasten'd to the rocks by a common broad surface, after the manner of coral, and such-like marine productions, and are of a coriaceous substance. Hither likewise may be referr'd the soft lithophyton, usually call'd the sea mulberry, and described by our author,

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which,

which, upon observation, exhibits nearly the same phenomena with the preceding.

It remains now, that I lay before you some account of our author's opinion concerning the propagation of these animals. He supposes, that they spawn, as oysters do ; and that their spawn is enveloped in a viscous substance, like that of testaceous and other fish ; and that by this viscosity it is fasten'd indifferently to whatever solid body falls in its way, whether it be a rock, glass, broken pots, flint-stones, and such-like. This viscous matter, coming to stagnate, is changed, according to its nature, into a solid, and forms a *lamina* or *stratum*, such as is observed at the base of these productions, and serves as it were for their first principle. The egg, enveloped in this viscous substance, is hatch'd in its proper time, and furnishes the animal, which resembles the sea polype, and other soft fish. These animals have all the necessary organs, and among others a particular gut, which, in the cuttle-fish, is fill'd with a black liquor, the use of which, according to the vulgar opinion, is that of being pour'd out at pleasure, to prevent the animal being taken when pursued : but this liquor, according to our author, serves the animals, the subjects of this treatise, with a matter capable of growing hard ; and furnishes the increase of the body or shell of the animal, which, like other shells, remains always of the same form, and is of a size proportionable to the animal. In the madrepora it lifts itself up under the animal, which always lies upon it ; but in the millepora it increases from the centre as the animal grows larger ; and thus these marine productions grow in just proportions.

These

These animals are nourish'd without changing their place, like American oysters, which fasten themselves to the roots of the *mangles*; or like what has been heretofore call'd *concha anatifera*, which fastens itself to old planks. Nature has furnish'd these polypes with claws, which they occasionally protrude from their cells, and seize their prey, as it passes by them; and thus they are nourished, and increase, according to their particular mechanism and construction.

There are some species of the polype of the madrepora, which are produced singly, others in clusters. The first of these kinds may arise from the parent animal furnishing but one egg at a time: other species deposit a number of these eggs at the same time, which coming to life all together are joined in such a manner, that they seem to constitute one and the same body.

The millepora's grow one upon another; their little animals produce their spawn, which attaching itself either to the extremity of the body already formed, or underneath it, gives a different form to this production. Hence the various shapes of the millepora, which is composed of an infinite number of the cells of these little insects, which all together exhibit different figures, notwithstanding that every particular cellule has its essential form, and the same dimensions, according to its own species.

I have thus endeavour'd, in as concise a manner as I was able, to communicate some account of the labours of the very ingenious author of the work before us. The time allow'd by the Society for these extracts does not permit me to give any idea of his

arrangement of the great variety of bodies, the subjects of this treatise, which is interspersed everywhere with very curious remarks. You see, that M. de Peyssonnel, if his system is admitted, has made a great alteration in that part of natural history, of which we are now treating. Naturalists had been divided, whether coral, and the harder productions of the sea, should be consider'd as plants or stones. Those, who look'd upon them as stones, among whom was Dr. Woodward, imagin'd themselves justified in this opinion, from their excessive hardness, and from their specific gravity; and they were herein confirm'd, by observing, that if these bodies were calcined, they were converted into lime. Guisónæus, in his letter to Boccone, says positively, that coral is not a plant, but a real mineral, composed of much salt, and a small quantity of earth: he supposes its form given it by a precipitation, something like that of the *arbor Dianæ* of the chemists.

Dioscorides, Pliny, Cæsalpinus, Boccone, Ray, Tournefort, and Geoffroy, thought coral to be a plant, from its root's being fixed to rocks or stones, as those of trees are to the earth; and from its sending forth a trunk, which ramified into branches. This opinion was seemingly strengthen'd by Boccone's observation of the milky juice at the tops and in the cells of coral; and most of all by the Count de Marfigli's discovering, in the year 1706, what he conjectured were the flowers of coral. Both these opinions, countenanced by long time, and great authority, M. de Peyssonnel has endeavoured to overturn; and to shew, that these productions were neither stones, nor vegetables, but animals; and that,
like

like oysters, and other shell-fish, nature had impower'd them to form themselves a stony dwelling for their protection and support, each according to its kind.

Some account of M. de Peyssonnel's discoveries was transmitted by him to the Royal Academy of Sciences at Paris in the year 1727; but they were not much attended to, till our ingenious brother Mr. Trembley's discovery of the fresh-water polype. This added much to their weight, and occasion'd M. Bernard de Jussieu, of this Society, and of the Royal Academy of Sciences at Paris, to visit, in the year 1741, the sea-coasts of Normandy, in order to satisfy himself of the nature of these marine productions; and his observations confirmed those of M. de Peyssonnel. The sentiments of that great naturalist M. de Reaumur upon this subject may be seen at large in the preface to the sixth volume of his history of insects.

I cannot conclude this account, without observing, that, in my opinion, the Royal Society is greatly obliged to M. de Peyssonnel, for his transmitting this manuscript, which I consider as a very valuable literary present.